CLAIMS

We claim:

1.   An apparatus for wirelessly communicating with at least one mobile unit within a wireless local area network, wherein the wireless local area network communicates with an external, wired, computer network, the apparatus comprising:

a base module positioned within a stack, wherein the stack forms a node within the wireless local area network;

an antenna module positioned within the stack;

at least a first wireless module positioned within the stack and coupled to the base and antenna modules;

wherein at least the first wireless module is configured to perform automatic self-discovery, wherein performing automatic self-discovery includes:

automatically determining a position of the wireless module within the stack;

automatically identifying other modules in the stack; and,

automatically determining whether the node is coupled to communicate with the external, wired, computer network via a wired or wireless communication link.

2.   The apparatus of claim 1 wherein the first wireless module periodically performs automatic self-discovery, and

wherein determining whether the node is coupled to communicate with the computer network includes determining whether Dynamic Host Configuration Protocol (DHCP) was received wirelessly or via a wired Ethernet connection.

3.   The apparatus of claim 1 wherein the first wireless module includes a finite state machine to perform automatic self-discovery.

4.   The apparatus of claim 1, further comprising a second wireless module positioned within the stack and coupled to the base and antenna modules, wherein

the second module is configured to perform automatic self-discovery, and wherein the first and second wireless modules each implement a different IEEE 802-type wireless protocol.

5. The apparatus of claim 1 wherein performing automatic self-discovery includes automatically determining whether the apparatus is an access point or a backhaul for the wireless local area network, and

wherein determining whether the node is coupled to communicate with the computer network includes determining whether a network address was received via a wired or wireless connection.

6. An apparatus for providing communications between at least one wireless mobile unit and a wired network, the apparatus comprising:

base means for providing power and positioned within a node;

antenna means for providing wireless communications and positioned within the node;

at least one wireless module means for automatically determining backhaul connectivity to the wired network, wherein the wireless module means is positioned within the node and is coupled to the base and antenna means;

wherein the wireless module means includes:

means for automatically discovering backhaul connectivity to the wired network;

means for automatically determining communications paths to backhaul nodes in the wired network and identifying a shortest communications path with a selected one of the backhaul nodes; and,

means for automatically establishing a communications path with the selected backhaul node to provide communications between the wireless module means and the wired network via the selected backhaul node.

7. The apparatus of claim 6 wherein the means for automatically determining communications paths to backhaul nodes periodically determines communications paths to backhaul nodes to continuously provide optimal data traffic routing and to reroute the data traffic to a new backhaul node if the selected backhaul node fails.

8. The apparatus of claim 6 wherein the wireless module means employs a first type of encryption with the at least one wireless mobile unit, and employs a second type of encryption for data traffic provided to the selected backhaul node, wherein the first type of encryption permits the wireless mobile unit to exchange data with the wireless module means without compromising security of the data traffic provided to the selected backhaul node under the second type of encryption.

9. The apparatus of claim 6 wherein the selected backhaul node is an intermediate access point, wherein the intermediate access point in turn communicates with a backhaul node coupled to the wired network, and wherein the wireless module means communicates wirelessly with the intermediate access point.

10. The apparatus of claim 6 wherein the means for automatically determining communications paths to backhaul nodes includes means for determining round trip delay times for communication with the backhaul nodes, wherein determining the round trip delay includes considering a return signal strength indicator from each of the backhaul nodes.

11. The apparatus of claim 6 wherein the wireless module means includes at least one finite state machine means for performing access point selection.

12. The apparatus of claim 6 wherein the wireless module means includes first and second wireless module means positioned within the stack and coupled to the base and antenna module means, and wherein the first and second wireless module means each implement a different IEEE 802-type wireless protocol.

13.   A computer-readable medium whose contents cause at least one telecommunication node to perform a method of implementing a distributed partial mesh dynamic architecture with respect to an external wired network, the method comprising:

at the telecommunications node, automatically and periodically identifying communications paths to two or more backhaul nodes, wherein each of the two or more backhaul nodes are coupled to the external wired network;

at the telecommunications node, automatically and periodically identifying a shortest communications path with a selected one of the backhaul nodes;

at the telecommunications node, automatically establishing a communications path with the selected backhaul node to provide communications between the telecommunications node and the external wired network via the selected backhaul node; and,

at the telecommunications node, automatically detecting a fault condition and establishing a new communications path with a new backhaul node to provide communications between the telecommunications node and the external wired network via the new backhaul node.

14.   The computer-readable medium of claim 13 wherein the computer-readable medium is a memory of the telecommunications node.

15.   The computer-readable medium of claim 13 wherein the computer-readable medium is a logical node in a computer network receiving the contents.

16.   The computer-readable medium of claim 13 wherein the computer-readable medium is a computer-readable disk.

17.   The computer-readable medium of claim 13 wherein the computer-readable medium is a data transmission medium carrying a generated data signal containing the contents.

18.   The computer-readable medium of claim 13 wherein the computer-readable medium is a memory of a computer system.

19.   A system for providing wireless connectivity between multiple mobile units and an external wired network, the method comprising:

at least first and second fixed network controller nodes, wherein each of the first and second network controller nodes are configured to exchange data with the external wired network;

multiple, fixed wireless base stations, wherein each of the multiple wireless base stations comprises:

memory;

at least one processor coupled to the memory, and

multiple software suites executed by the at least one processor, wherein the software suites include:

at least one software module to permit data exchange with at least one of the first and second fixed network controller nodes,

at least one wireless protocol software stack for permitting wireless communications exchange with at least some of the mobile units, and

a mesh network software suite configured to periodically identify neighboring wireless base stations and network controller nodes, and further configured to periodically identify preferred communications paths to the external wired network via one of the network controller nodes or via one of the multiple wireless base stations.

20.   The system of claim 19 wherein the wireless protocol software stack includes at least two software modules each for implementing a different short range wireless communications protocol.

21.   The system of claim 19 wherein periodically identifying preferred communications paths includes determining a best combination of round trip delay

time with, and received signal strength indication from, at least some of the network controller nodes and wireless base stations.

22.   The system of claim 19 wherein periodically identifying preferred communications paths includes determining a highest data communications rate with at least some of the network controller nodes and wireless base stations.

23.   The system of claim 19 wherein the mesh network software suite includes at least one self-discovery module configured to identify at least some of the functionality provided by the multiple wireless base station itself.

24.   The system of claim 19 wherein the multiple software suites includes a Transmission Control Protocol/Internet Protocol (TCP/IP) suite.

25.   The system of claim 19 wherein the multiple software suites includes an Ethernet connection software module.

26.   The system of claim 19 wherein the multiple software suites includes a software management suite.

27.   The system of claim 19 wherein the multiple software suites includes a security portion to permit encrypted data exchange with at least one of the first and second fixed network controller nodes.